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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/798,398	03/12/2004	Norihito Tsukahara	2004_0211A	6041

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EXAMINER	
PATEL, ISHWARBHAI B	
ART UNIT	**PAPER NUMBER**
2841	

DATE MAILED: 01/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/798,398	TSUKAHARA ET AL.	
	Examiner	Art Unit	
	Ishwar (I. B.) Patel	2841	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 November 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the amendment filed on November 16, 2005.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Capote (US Patent No. 6,297,560).

Regarding claim 1, Capote, in figure 3, discloses an electronic circuit device comprising: an electronic component (10) having a connection terminal (24) on one side thereof; a circuit board (20) having an electrode pad (12); an adhesive sheet (22) having a through-hole (18), with a cross-sectional area of said electrode pad being greater than a cross-sectional area of said through-hole (cross sectional area of the pad 12 is greater than the that of hole 18 near the pad 12, see figure 3); and a conductive adhesive (14)

provided in said through-hole (18); wherein said electronic component (10) and said circuit board (20) are bonded to each other via said adhesive sheet (22), and said connection terminal on said electronic component and an electrode pad on said circuit board are bonded to each other by said conductive adhesive in said through-hole (see figure 3).

Regarding claim 2, Capote further discloses at least one of said connection terminal (24) protrude into said through-hole (18).

4. Claims 1 and 2 are rejected under 35 U.S.C. 102(e) as being anticipated by Haba (US Patent No. 6,675,469).

Regarding claim 1, Haba, in figure 16, discloses an electronic circuit device comprising: an electronic component (900) having a connection terminal (904) on one side thereof; a circuit board (906) having an electrode pad (908); an adhesive sheet (910) having a through-hole (912), with a cross-sectional area of said electrode pad being greater than a cross-sectional area of said through-hole (see figure 16); and a conductive adhesive (914, column 19, line 6-15) provided in said through-hole (912); wherein said electronic component (900) and said circuit board (906) are bonded to each other via said adhesive sheet (910), and said connection terminal on said electronic component and an electrode pad on said circuit board are bonded to each other by said conductive adhesive in said through-hole (column 19, line 1-15, see figure 16).

Regarding claim 2, Haba further discloses at least one of said connection terminal (904) protrude into said through-hole (912).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gilleo (US Patent No. 6,252,301) in view of Capote (US Patent No. 6,297,560), Haba (US Patent No. 6,675,469) and Itou (US Patent No. 6,512,185).

Regarding claim 1, Gilleo, in figure 1, discloses an electronic circuit device comprising: an electronic component (100) having a connection terminal (150) on one side thereof; a circuit board (120) having an electrode pad (200); an adhesive sheet (110) having a through-hole (aperture 180); and a conductive adhesive provided in said through-hole (conductive polymer 190, column 5, line 8); wherein said electronic component and said circuit board are bonded to each other via said adhesive sheet, and said connection terminal on said electronic component and an electrode pad on said circuit board are bonded to each other by said conductive adhesive in said through-hole (see figure 1). Gilleo does not disclose a cross-sectional area of said electrode pad

being greater than a cross-sectional area of said through-hole. Cross section area of electrode pad (200) is smaller than that of the through hole (180).

Capote, in figure 3, discloses an electronic circuit device with electronic component (10) having a connection terminal (24) connected to an electrode pad (12) of a circuit board (20) with a an adhesive sheet (22) and further recites cross-sectional area of said electrode pad being greater than a cross-sectional area of said through-hole (see figure).

Haba, in figure 16, discloses an electronic circuit device with electronic component (900) having a connection terminal (904) connected to an electrode pad (908) of a circuit board (906) with a an adhesive sheet (910) and further recites cross-sectional area of said electrode pad being greater than a cross-sectional area of said through-hole (see figure, 16).

Itou, in figure 1 and discloses an insulating layer (6a) covering the periphery of the pad (3a) to increase the adhesive strength of the pad with the board (10) to avoid delaminating of the pad from the board (this is the improvement on the prior art of figure 8, where the pad is delaminated)

From the prior art of Capote and Haba, though not explicitly disclosed by both Capote and Haba, it can be seen that larger pad on the circuit board than that of the through hole in the adhesive sheet will facilitate covering the surface of pad on the periphery, which will enhance the adhesive strength of the pad and avoid peeling / delamination, as recited by Itou.

A person of ordinary skill in the art at the time of applicant's invention would have been motivated to provide the pad larger that the through hole in the adhesive sheet in order to increase the adhesive strength of the pad to avoid peeling of the pad.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the structure of Gilleo with the cross-sectional area of said electrode pad being greater than a cross-sectional area of said through-hole, from the teaching of Capote, Haba, and Itou in order to enhance the adhesive strength of the pad and avoid peeling delamination.

Regarding claim 2, the modified structure of Gilleo further discloses at least one of said connection terminal (150) protrude into said through-hole (see figure 1).

Regarding claim 3, the modified structure of Gilleo further discloses said circuit board comprises a polymeric resin sheet (column 5, line 16-20).

Regarding claim 4, the modified structure of Gilleo further discloses said polymeric resin sheet is made of polyimide (column 5, line 19-20, made of Kapton®, which is a polyimide film from DuPont).

Regarding claim 5, the modified structure of Gilleo further discloses said conductive adhesive is a conductive paste consisting essentially of conductive particles and a thermosetting resin binder (Column 5, line 8-13).

Regarding claim 6, the modified structure of Gilleo further discloses said adhesive sheet is one of a thermosetting resin sheet and a thermoplastic resin sheet (column 4, line 64-67).

7. Claim 7 rejected under 35 U.S.C. 103(a) as being unpatentable over the modified structure of Gilleo (modified with Capote, Haba, and Itou), as applied to claim 1, 5 and 6 above, and further in view of Hass (US Patent No. 6,245,695).

Regarding claim 7, the modified structure of Gilleo discloses all the features of the claimed invention including said conductive adhesive essentially consists of conductive particles and a thermosetting resin binder (as applied to claim 5 above, Column 5, line 8-13), and said adhesive sheet includes a thermosetting resin (as applied to claim 6 above, column 4, line 64-67).

Gilleo does not explicitly disclose said thermosetting resin being such that it begins to cure at a lower temperature than does said thermosetting resin binder.

However, Gilleo further recites that the adhesive sheet (compliant interposer layer 110 is made with sufficient filler and hardener to provide a solid uncured composite to receive the conductive adhesive into the holes, column 4, line 64 to column 5, line 13).

Hass discloses a bondply material using resin material and further recites that the properties of the resin material including the strength, or durability or heat resistance

or curing temperature can be adjusted to the desired value by the changing the percentage of resin and adding additives in the material, column 7, line 6-45.

Further, it can be seen from the structure of Gilleo (figure 1) that the adhesive sheet (compliant interposer 110) should be cured first to provide enough rigidity to hold the conductive adhesive in the holes in order to have reliable electrical connection.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the modified device of Gilleo with said thermosetting resin being such that it begins to cure at a lower temperature than does said thermosetting resin binder, in order to have enough rigidity to the conductive adhesive in the holes to have reliable electrical connection, from the teachings of Hass.

Response to Arguments

8. Applicant's arguments with respect to claims 1-7 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Tsunoi (US Patent No. 6,429,516) in figure 2(a) discloses structure with pad (24) on a circuit board (22) larger than the hole in the interposer (21).

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (571) 272 1933. The examiner can normally be reached on M-F (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (571) 272 1957. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

IBPatel

Ishwar (I. B.) Patel
Patent Examiner
Art Unit: 2841
January 14, 2006